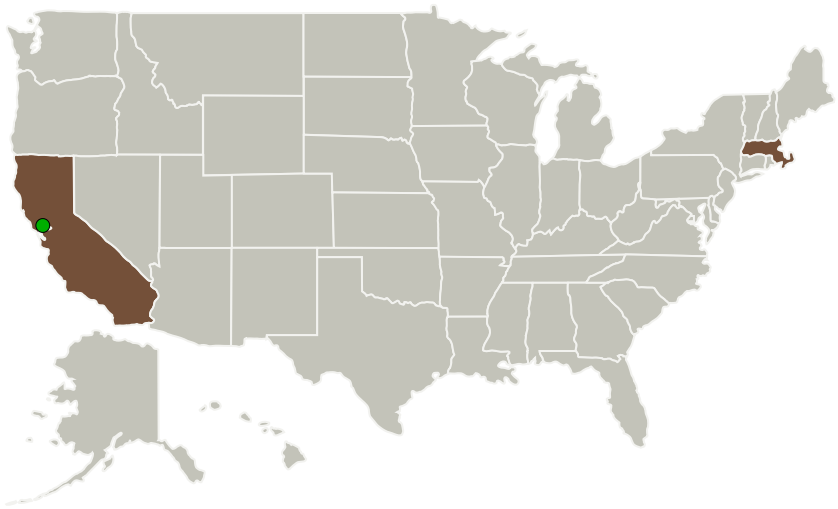
Bio-Electrochemical Carbon Dioxide Removal for Air Revitalization in Exploration Life Support Systems, Phase I

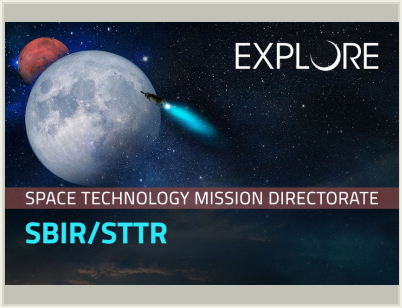
Completed Technology Project (2012 - 2012)

Project Introduction

An important aspect of the ISS air revitalization system for life support is the removal of carbon dioxide from cabin air and retrieves oxygen from CO2. The current state of art technology for CO2 reduction is Sabatier reaction, which is energy intensive and results in excess CO2. Cambrian Innovation has developed an electromethanogenesis bio-electrochemical system (BES) that is focused on reducing costs associated with CO2 reduction. The two-chambered BES system is designed to operate by producing a reliable stream of O2 while simultaneously bio-electrochemically reducing CO2 to CH4 and H2O. Phase I experiments and analysis will be used to determine whether it will be feasible to develop a cell which can replace the existing Sabatier reactor. Through Phase II and Phase III R&D we hope to develop and test a BES CO2 removal system for potential utilization aboard the ISS or related crewed systems.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Cambrian Innovation, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Boston, Massachusetts
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138017)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Cambrian Innovation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

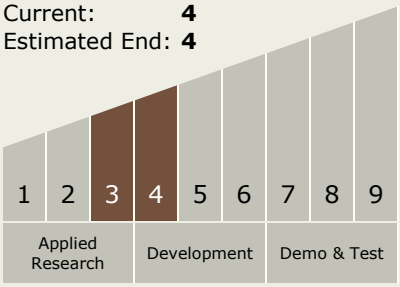
Carlos Torrez

Principal Investigator:

Zhen Huang

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System